

Detection of Dynamic ankle Instability, What the literature states

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The re-injury rate for lateral ankle sprains has been reported to exceed 70 percent of individuals suffering from a lateral ankle sprain and 40-75% may develop residual symptoms or chronic ankle dysfunction.

Chronic ankle pain dysfunction typically includes complaints of pain during activity, recurrent swelling, a feeling of giving way and repetitive injury.

Freeman et al put **these symptoms into two categories; mechanical instability and functional instability**. Mechanical instability refers to anatomical changes like joint laxity and ligament/capsule changes. Functional instability refers to impaired proprioception, strength and postural control, without ligament laxity.

Recently, researchers have attempted to find both clinical and lab measures that could detect deficits. Static conditions fail to elicit postural control deficiencies due to ease of the procedure. Therefore a **dynamic measure** would be more challenging and potentially more effective for detecting deficits in subjects with joint instability.

Reimann et al developed a dynamic measure by subjectively measuring postural control during functional performance tasks. They used a multiple **single leg hop test**.

A newer objective measure is the **Time to Stabilization (TTS)**. This is a functional test that forces subjects to maintain balance through transition from a dynamic to a static state. Two protocols have been used to measure this. One is a step down off an elevated platform or jump a set distance with a minimum height requirement and land on a force plate and regain their balance. Both protocols have been shown to be highly reliable.

Based on the results of Wilkstrom et al a jump protocol will be more reliable to detect differences in dynamic stability than a step protocol. The higher GRF during the jump protocol mimics sport activity and is more difficult to complete compared to the step test.

During single leg stance, control of posture is accomplished through corrective movements, with some occurring through reflexive ankle muscle contractions. Integration of sensory information related to ankle joint movement and position with information from the visual and vestibular systems is also believed to cause corrective muscle contractions.

Researchers speculate that static characteristics of single leg balance may not challenge the postural control system. Therefore single leg hop test are used as dynamic test. Researchers however, have not detected differences between legs with stable and functionally unstable ankles. The time to complete a series of hops and the maximum distance hopped are used to quantify single-leg hop performance and these measures may not be good indicators for detecting differences between legs. Colby et al suggested that examining the time it takes individuals to stabilize the ankle from a single leg landing on a force plate may provide a benefit.

The results from The Ross et al study showed individuals with FAI took longer to stabilize after a jump but their mean sway measures during single limb stance were not significant compared to controls. This suggests that FAI may be challenged more during single led landing and differences between FAI and stable ankles may go unnoticed with single limb stance tests.